CALIBRATION PROCEDURE

MODEL 800A TUBE TESTER

July, 1963

LIST OF TEST EQUIPMENT REQUIRED

1. D. C. Voltmeters, 1000 ohms per volt, with suitable ranges to read:

   a. 148 to 154 volts (200 volt range)
   b. 128 to 134 volts (200 volt range)
   c. 54 to 58 volts (200 volt range)
   d. 38 to 40 volts (50 volt range)
   e. 2.9 to 3.1 volts (10 volt range)

2. A. C. Voltmeter, Ballantine Model 300D or equal, with suitable ranges to read:

   a. 0.1 to 1.0 volts
   b. 1 to 10 volts
   c. 10 to 100 volts
   d. 100 to 400 volts

3. Micromho Calibrator consisting of a 60 cycle potentiometer with 0.1% accuracy and with less than 100 ohms internal impedance, connected through a 10,000 ohm 1%, 25 watt resistor.

4. Ground Tester
   (See Figure "A")
   This unit consists of a transformer: Hickok No. 20800-219, an NE45 neon indicator lamp and a 700 ohm 10 watt resistance.

5. One each: 1 megohm, 10%, 1/2 watt resistor.

6. One each: 6L6 tube calibrated in micromhos and in a "Good-Bad" reading on an Engineering Prototype Model 800A in accordance with test conditions listed on the respective roll chart.

GROUND TESTER - FOR TUBE TESTERS

TO CHECK FOR ISOLATION BETWEEN MAIN PANEL AND COMPONENT PARTS.

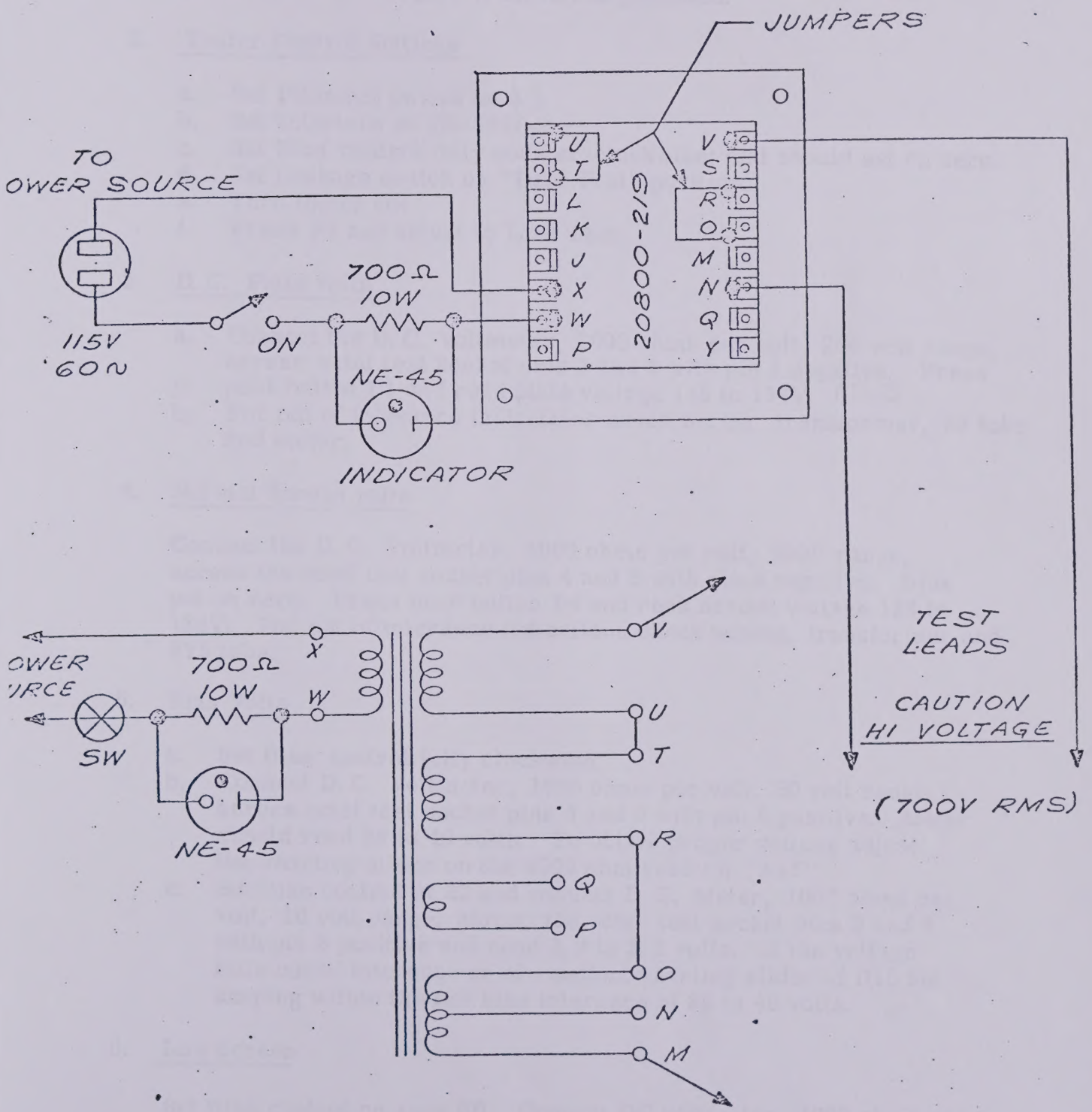

FIGURE "A"

W.H.T.

MODEL 800A CALIBRATION PROCEDURE

1. Ground Test - CAUTION - HIGH VOLTAGE

With the tester face down on the bench, connect a lead from the "Ground Tester" to the main panel of the tube tester. Touch all transformer, switch and other accessible terminals with the other lead from the ground tester.
Indicator lamp will glow if circuit is grounded.

2. Tester Control Settings

a. Set Filament switch on 6.3
b. Set Selectors on JR-5347-2
c. Set Bias control fully counter-clockwise; dial should set on zero.
d. Set Leakage switch on "Tube Test" position.
e. Turn tester ON
f. Press P7 and adjust to Line Test.

3. D. C. Plate volts

a. Connect the D. C. voltmeter, 1000 ohms per volt, 200 volt range, across octal test socket pins 3 and 8 with pin 8 negative. Press push button P4 and read plate voltage 148 to 154V.
b. For out of tolerance indications check wiring, transformer, 83 tube and meter.

4. Normal Screen volts

Connect the D. C. Voltmeter, 1000 ohms per volt, 200V range, across the octal test socket pins 4 and 8 with pin 8 negative. Bias pot on zero. Press push button P4 and read screen voltage 128 to 134V. For out of tolerance indications check wiring, transformer and 5Y3 tube.

5. Bias Volts

a. Set Bias control fully clockwise.
b. Connect D. C. Voltmeter, 1000 ohms per volt, 50 volt range across octal test socket pins 5 and 8 with pin 8 positive. Meter should read 38 to 40 volts. To obtain proper voltage adjust the shorting slider on the 8500 ohm resistor "R15".
c. Set Bias control at 22 and connect D. C. Meter, 1000 ohms per volt, 10 volt range, across the octal test socket pins 5 and 8 with pin 8 positive and read 2.9 to 3.1 volts. If the voltage falls out of tolerance at 22 readjust shorting slider of R15 but keeping within the full bias tolerance of 38 to 40 volts.

6. Low Screen

Set Bias control on zero (0). Connect DC voltmeter, 1000 ohms per

volt, 200 volt range across octal test socket pins 4 and 8 with pin 8 negative. Press and hold down P1 while pressing P4 and adjust tap slider on R15 (8500 ohms) for a reading of 56 volts (tolerance 54 to 58).

7. "English" Pot Calibration

a. Set selectors for 6L6, Bias to 17 - English to 88.

b. Plug in the calibrated 6L6 tube and let it heat up.

c. Twist the rear section of the "English" pot until the meter reads the "Good-Bad" reading for the 6L6 tube. Solder the pot sections together.

d. Remove the tube and connect the micromho calibrator 50 volts AC through 10,000 ohms to cathode and plate (pins 8 and 3). Press P4 and adjust "English" dial until the meter reads 2000 (2/3 scale). Note reading on dial. This is the position of the first red dot (near 73).
NOTE: If meter reads backward, reverse polarity of line.

e. Remove micromho calibrator and plug in 6L6 tube and let it heat up. With "English" dial on first dot position, press P4 and rotate the "Bias" dial until the meter reads exactly full scale (3000). Then adjust the "English" dial until the meter reads 1500 (center scale). Note reading on dial. This is the position of second red dot to provide a full scale of 6000.

Then adjust the "English" dial until the meter reads 600 (1/5 scale). Note reading. This is the position of third red dot to provide a full scale of 15,000.

f. Re-set controls for the 6L6 tube as per chart and check the tube for its micromhos reading and retwist the "English" pot slightly if necessary to set the 6L6 closer to its micromhos reading.

8. Gas Test

a. With the 6L6 tube still in the test socket connect a 1 megohm resistor across pins 5 and 7 (grid and cathode) of the "Locktal" socket.

b. Press "P5" and rotate the "Bias" control until the meter reads 100 on the 3000 scale. Hold P5 down and Press P6;meter pointer should move up-scale. (The 1 megohm resistor could be attached permanently to pins 5 and 8 of the 6L6 tube to expedite testing.)

c. Press P5 and rotate Bias dial until meter reads 100 on 3000 micromho scale.

d. Hold down P5 and press P6.
Meter pointer should move upscale when P6 is pressed.

12. Tube Tests

Tests on the following tubes are designed to check out proper wiring of the test sockets and test circuits. Using the test conditions listed on the Model 800A roll chart, "English" or "Replace - Good" readings with respect to the 0-6000 meter scale shall be obtained on the following tubes on the Model 800A Engineering prototype.

0Z4	6C9	6GE5	75
6A7	6CW4	6L6	83
6AY3	6DV4	7N7	807

Minimum and maximum readings based on 85% and 115% of the Engineering prototype readings shall be determined for each tube.

13. Subminiature Tube Test Sockets

Check subminiature 7 pin inline and circular 8 pin test socket wiring with ohmmeter for continuity of wiring to the large 9-pin (Novar) socket. Pin 1 submin. to pin 1 novar, pin 2 submin. to pin 2 novar, etc.

14. Transistor Tests

With Leakage switch in Tube Test position, adjust meter to Line Test. Insert transistor, 2N1302 NPN - 2N1193 PNP, into proper transistor socket (NPN or PNP), turn leakage switch to transistor test position and rotate shunt control until meter reads full scale or to the maximum reading obtainable.

Move slide switch from Gain to Leakage position. Meter will now read leakage current which will be indicated on the Good-Poor scale of the meter.

15. Diode Test

Insert the 1N1692 diode, reversed to panel marking, into the test jacks on the panel with the cathode of the diode into the black (-) jack and with the anode of the diode into the red (+) jack. With the Leakage switch in the Transistor Test position, determine a Shunt dial position that provides a full scale (100%) meter reading. The diode is then removed from the jacks and reinserted with the cathode to red (+) jack and anode to black (-) jack per panel marking. The reading on the meter should now be 10% or less on the 0-100% scale for a known good 1N1692 diode.

12. Tube Tests

Read 0-6000 scale

0Z4	Diode 1:	Min_____	Max_____	Read_____
	Diode 2:	Min_____	Max_____	Read_____
6A7	Pent.:	Min_____	Max_____	Read_____
	Osc.:	Min_____	Max_____	Read_____
6AY3		Min_____	Max_____	Read_____
6C9	Tetr. 1:	Min_____	Max_____	Read_____
	Tetr. 2:	Min_____	Max_____	Read_____
6CW4		Min_____	Max_____	Read_____
6DV4		Min_____	Max_____	Read_____
6GE5		Min_____	Max_____	Read_____
6L6		Min_____	Max_____	Read_____
7N7	Tri. 1:	Min_____	Max_____	Read_____
	Tri. 2:	Min_____	Max_____	Read_____
75	Triode:	Min_____	Max_____	Read_____
	Diode 1:	Min_____	Max_____	Read_____
	Diode 2:	Min_____	Max_____	Read_____
83	Plt. 1:	Min_____	Max_____	Read_____
	Plt. 2:	Min_____	Max_____	Read_____
807		Min_____	Max_____	Read_____

13. Subminiature Tube Test Sockets

Wiring of submin. sockets to novar socket.
Write in submin. pin number that is wired to novar socket.

Novar Pins	1	2	3	4	5	6	7	8	9
Submin 8	___	___	___	___	___	___	___	___	___
In line 7	____	___	____	___	____	___	___	____	____

14. Transistor Tests

Check if transistor provides normal up-scale "Gain" reading.

PNP 2N1193 _____

NPN 2N1302 _____

Check if transistor provides near zero or leakage reading.

PNP 2N1193 _____

NPN 2N1302 _____

PARTS LIST FOR MODEL 800A TUBE TESTER

Reference designations are assigned to identify all parts of the Model 800A. These designations are used in the Parts List and Schematic Wiring Diagram. The letter prefix of a reference designation indicates the kind of part -- resistor, capacitor, electron tube, etc. The number differentiates between parts in the same group.

REF. DESIG.	NOTES	NAME AND DESCRIPTION	HICKOK PART NO.
A1		DIAL ASSEMBLY: Bias Control	4160-67
A2		DIAL ASSEMBLY: Shunt Control	4160-73
C1		CAPACITOR, ELECTROLYTIC: 50 μf, 6 volts	3085-45
C2		CAPACITOR, PLASTIC,TUBULAR: .5μf, 200 volts	3105-206
C3		CAPACITOR, CERAMIC: .005 μf	3110-7
C4		Same as C3	
F1		LAMP: #81, bayonet type, for 115 volt operation	12270-2
F1		LAMP: #63, bayonet type, for 230 volt operation	12270-58
F2		LAMP: #49 pilot, .06 amp, 2 volts	12270-17
J1		JACK: pin plug type, red	10300-1
J2		JACK: pin plug type, black	10300-2
J3		Same as J1 PLATE CAP	
J4		Same as J2 GRID CAP	
M1		METER: D. C., 66K, 500 microamps, 233 ohms	660-114
MP1		KNOB: machined, with white dot, bar type	11505-46
MP2		Same as MP1	
MP3		Same as MP1	
MP4		Same as MP1	
MP5		Same as MP1	
MP6		Same as MP1	
MP7		Same as MP1	
MP8		Same as MP1	
MP9		Same as MP1	
MP10		Same as MP1	
P1		CORD: AC line	3675-7
R1		RHEOSTAT: 350 ohms, 25 watts, with concentric off position (Line Adjust)	18750-37
R2		RESISTOR: 100 ohms, 10%, 10 watt, center tapped	18575-19
R3		Not Assigned	
R4		RESISTOR, FIXED, DEPOSITED FILM: 12 ohms, 1%, 1/2 watt	18537-59
R5		RESISTOR, FIXED, COMPOSITION: 1.2K ohms, 10%, 1 watt	18422-122

REF. DESIG.	NOTES	NAME AND DESCRIPTION	HICKOK PART NO.
R6		RESISTOR, FIXED: 1800 ohms, 10%, 10 watt	18575-12
R7		RESISTOR, FIXED, DEPOSITED FILM: 215K ohms, 1%, 1 watt	18539-32
R8		RESISTOR, FIXED, DEPOSITED FILM: 133 ohms, 1%, 1/2 watt	18537-91
R9		POTENTIOMETER, WIRE WOUND: 150-150 ohms (Shunt Control)	16925-90
R10		Same as R9 (Shunt Control)	
R11		RESISTOR, FIXED, DEPOSITED FILM: 112K ohms, 1%, 1/2 watt	18537-55
R12		RESISTOR, FIXED, COMPOSITION: 47 ohms, 10%, 1/2 watt	18410-472
R13		RESISTOR, FIXED, COMPOSITION: 220K ohms, 10%, 1/2 watt	18414-222
R14		Same as R13	
R15		RESISTOR, WIRE WOUND: 8500 ohms, 10 watt	18575-89
R16		POTENTIOMETER, ADJUSTED: (3K) (Bias Control)	16926-5
R17		RESISTOR, FIXED, COMPOSITION: 180K ohms, 10%, 1/2 watt	18414-182
R18		Same as R12	
R19		RESISTOR, FIXED, COMPOSITION: 680 ohms, 10%, 1/2 watt	18411-682
R20		RESISTOR, FIXED, COMPOSITION: 220 ohms, 10% 1/2 watt	18411-222
R21		RESISTOR, FIXED, COMPOSITION: 15K ohms, 5%, 1 watt	18423-151
R22		RESISTOR, FIXED, DEPOSITED FILM: 200 ohms, 1%, 2 watt	18540-5
S1		SWITCH: Slide D. P. D. T. spring return (Gain - Leakage)	19911-64
S2		SWITCH: Rotary, 1 section, 2 pole, 20 positions (Filament Selector Switch)	19912-202
S3		SWITCH: Push Button, 7 button gang	19910-95
S4		SWITCH: Rotary, 1 section, 14 position (Filament Selector)	19912-477
S5		Same as S4 (Filament Selector)	
S6		Same as S4 (Grid Selector)	
S7		SWITCH: Rotary, 1 section, 14 position (Plate Selector)	19912-469
S8		Same as S7 (Screen Selector)	
S9		Same as S7 (Cathode Selector)	
S10		Same as S7 (Suppressor Selector)	
S11		SWITCH: Rotary, 6 section, 7 position, (Leakage Test)	19912-376

REF. DESIG.	NOTES	NAME AND DESCRIPTION	HICKOK PART NO.
T1		TRANSFORMER: Power	20800-305
V1		TUBE: 83	20875-28
V2		TUBE: 5Y3GT/G	20875-6
XF1		SOCKET: bayonet	19350-1
XF2		SOCKET: miniature, bayonet base	19350-203
XQ1		SOCKET: Transistor	19350-280
XV1		SOCKET: wafer, 4 pin	19350-157
XV2		SOCKET: wafer, octal	19350-156
XV3		SOCKET: 9 pin, Novar	19350-367
XV4		SOCKET: 4 pin, black	19350-93
XV5		SOCKET: 5 pin	19350-94
XV6		SOCKET ASSEMBLY: 5 pin Nuvistor	19350-381
XV7		SOCKET: 6 pin	19350-95
XV8		SOCKET: 7 pin	19350-96
XV9		SOCKET: 8 pin, octal	19350-99
XV10		SOCKET: Loctal, 8 pin	19350-97
XV11		SOCKET: 9/10 pin miniature	19350-364
XV12		SOCKET: 7 pin miniature	19350-136
XV13		SOCKET: 12 pin, Compactron	19350-365
XV14		SOCKET: 7 pin Nuvistor Assembly	19350-382
		BOOKLET: Instructions	2490-477
		CHART: Data Roll	3200-98

NOTE: A minimum billing charge of $3.50 will be assessed for any parts order. Prices are subject to change without notice.

MP MASTER
MA26046